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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/068,154	02/06/2002	Jerrold E. Franklin	ALT-CMP	8513
7590 04/12/2004				
EXAMINER				
CANTELMO, GREGG				
ART UNIT			PAPER NUMBER	
1745				

DATE MAILED: 04/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/068,154

Applicant(s)

FRANKLIN ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 12-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 10, 2004 has been entered.

Response to Amendment

2. In response to the amendment received February 10, 2004:
- a. Claim 11 has been cancelled. Claims 1-10 and 12-23 are pending;
 - b. The prior art rejections of Diethelm are withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 8-10, 12-21 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. patent No. 6,468,682 (Fuglevand).

Fuglevand discloses a fuel cell assembly (Figs. 1-4 and 10) comprising a membrane electrode assembly (101/105/102 in Fig. 10), a bipolar separator plate 20 and independently acting compliant electrical contacts 70 disposed between the membrane electrode assembly (MEA) and the bipolar separator plate (Fig. 10). The contacts 70 as shown in Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10 (as applied to claims 1 and 2).

The arrangement of the contacts as shown in Figs. 2, 3 and 10 having an end affixed to the separator 20 and an extending free end 71 will effectively operate in a spring-like manner upon compression of the stack. In addition these members are clearly defined as "elastically deformable electrically conductive members 70 at col. 4, ll. 35-38. Therefore the members 70 are held to embody a spring (as applied to claim 3).

The electrical contacts 20 are formed into an array having a length and width, wherein the MEA has a respective length and width and wherein the length and width of the array of contacts 20 is approximately equal to the length and width of the MEA (Figs. 1-3 and 10 as applied to claims 8-10).

Fuglevand discloses independently acting compliant electrical contacts 70 for maintaining electrical contact between a bipolar separator plate 20 and a membrane electrode assembly (101/105/102) in a fuel cell stack. The contacts 70 as shown in

Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as “elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Figs. 1-4 and 10 as applied to claim 12).

The arrangement of the contacts as shown in Figs. 2, 3 and 10 having an end affixed to the separator 20 and an extending free end 71 will effectively operate in a spring-like manner upon compression of the stack. In addition these members are clearly defined as “elastically deformable electrically conductive members 70 at col. 4, ll. 35-38. Therefore the members 70 are held to embody a spring (as applied to claim 13).

Fuglevand discloses a method for maintaining electrical contact between a bipolar separator plate 20 and a membrane electrode assembly (101/105/102) comprising placing independently acting compliant electrical contacts 70 between said bipolar separator plate 20 and said membrane electrode assembly in a fuel cell stack. Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as “elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Figs. 1-4 and 10 as applied to claim 14).

Fuglevand discloses a fuel cell assembly (Figs. 1-4 and 10) comprising a membrane electrode assembly (101/105/102), a bipolar separator plate 20 and means 70 for making electrical contact between the membrane electrode assembly (MEA) and

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the bipolar separator plate. Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as “elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Fig. 1-4 and 10 as applied to claim 15).

Fuglevand discloses a fuel cell assembly (Figs. 1-4 and 10) comprising a membrane electrode assembly (101/105/102), a bipolar separator plate 20 and electric contact members 70 for making electrical contact between the membrane electrode assembly (MEA) and the bipolar separator plate. Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as “elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Fig. 1-4 and 10 as applied to claim 16).

The arrangement of the contacts as shown in Figs. 2, 3 and 10 having an end affixed to the separator 20 and an extending free end 71 will effectively operate in a spring-like manner upon compression of the stack. In addition these members are clearly defined as “elastically deformable electrically conductive members 70 at col. 4, ll. 35-38. Therefore the members 70 are held to embody a spring (as applied to claim 17).

The fuel cell assembly of Fuglevand comprises a bipolar separator plate 20, having first and second sides; a membrane electrode assembly (101/105/102) attached

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to the first side of the separator 20 via either contacts 70 or edge sealing means and sealed along the periphery of the MEA, and independently-acting compliant electrical contacts are attached to the second side of the separator. Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as "elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Figs. 1-4 and 10 as applied to claim 18).

Fuglevand discloses a fuel cell stack comprised of a first assembly according to claim 18 and a second assembly according to claim 18, wherein the electrical contacts 70 of the first assembly are in electrical contact with the MEA of the second assembly (Figs. 2, 3 and 10 as applied to claim 19).

Fuglevand discloses a fuel cell assembly comprising a membrane electrode assembly (101/105/102), a bipolar separator plate 20 and an independently-acting compliant electrical contact 70 for making electrical contact between the membrane electrode assembly (MEA) and the bipolar separator plate. Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as "elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Figs. 1-4 and 10 as applied to claim 20).

WO '638 discloses a fuel cell assembly (Fig. 2) comprising a membrane electrode assembly (17/18/19), a bipolar separator plate 21 first means 20 for maintaining electrical contact between the membrane electrode assembly (MEA) and the bipolar separator plate and second means along the periphery of the stack for sealing the MEA with the bipolar separator plate 20 wherein the second means functions independently from the first means. Figs. 2 and 3 are attached to the separator 20 and are contact the MEAs via portion 71 (as shown in Fig. 10), the portions 71 are not permanently attached to the MEA given the arrangement shown in the combined teachings of Figs. 2, 3 and 10. Members 70 are clearly defined as "elastically deformable electrically conductive members 70 at col. 4, ll. 35-38 (Figs. 1-4 and 10 as applied to claim 21).

Response to Arguments

5. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

6. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand in view of U.S. patent No. 6,224,396 (Chan).

The teachings of claim 1 with respect to Fuglevand have been discussed above and are incorporated herein.

The differences between the instant claims and Fuglevand are that Fuglevand does not disclose that the contacts 70 are springs having an inverted V-shape (claim 4), S-shape (claim 5) or Z-shape (claim 6).

Chan discloses that spring connectors and more particularly Z-shaped electrical contacts have been conceived and applied in the art of electrical connections (abstract, col. 5, ll. 8-11 and figures). The Z-shaped configuration prevents bowing or cracking of the connected structure (abstract as applied to claims 3, 6, 13 and 17).

A Z-shape is comprises of two V-shaped portions wherein one V-shape portion of the Z-shape spring is inverted relative to the other V-shaped portion of the Z-shape spring (Fig. 5C as applied to claims 3, 4, 13 and 17).

Alternatively the springs can have an S-shape (Fig. 7E). While Chan labels this shape as the shape of a 2, it is evident from the Fig. 7E that this also constitutes an S shape (as applied to claims 3, 5, 13 and 17)

The motivation for using a Z-shaped configuration which comprises inverted V-shaped sections therein or an S-shaped configuration for the electrical contacts is that it provides a contact shape that eliminates bowing or cracking of the electrical contacts.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Fuglevand by using a Z-shaped configuration which comprises inverted V-shaped sections therein or an S-shaped configuration for the electrical contacts since it would have provided a contact shape that eliminates bowing or cracking of the electrical contacts.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand in view of U.S. Patent No. 5,299,939 (Walker).

The teachings of claim 1 have been discussed above and are incorporated herein.

The differences between the instant claims and Fuglevand are that Fuglevand does not disclose that the contacts 70 are omega shaped having a height and a tapered middle section, said tapered middle section having a width and wherein the width is at least 50% as great as the height (claim 7).

Walker discloses that spring connectors and more particularly omega-shaped electrical contacts have been conceived and applied in the art of electrical connections (abstract, 1-3) and the width of the sides of the connectors are at least 50% as great as the height of the connector.

The motivation for using a omega-shaped contacts for the electrical contacts is that it provides contacts having a high density, substantial compliance to provide compensation variations such as manufacturing tolerances and thermo-mechanical expansion, low contact resistance and low inductance. In addition the omega-shaped contact function that when an external force is applied on the spring, the spring deflects accordingly (Fig. 3).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Fuglevand by using an omega-shaped contact having a tapered middle section, said tapered middle section having a width and wherein the width is at least 50% as great as the height since it

would have provided contacts having a high density, substantial compliance to provide compensation variations such as manufacturing tolerances and thermo-mechanical expansion, low contact resistance and low inductance.

Response to Arguments

8. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo
Primary Examiner
Art Unit 1745

gc

A handwritten signature in cursive script, appearing to read "Gregg Cantelmo".

April 3, 2004